



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,153	07/02/2001	Koon Gee Neoh	1781-0233P	9536

2292 7590 12/20/2002

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER

TSOY, ELENA

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 12/20/2002

7

Please find below and/or attached an Office communication concerning this application or proceeding.

7C-7

## Office Action Summary

Application No.

09/895,153

Applicant(s)

NEOH ET AL.

Examiner

Elena Tsoy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2002.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19,21,23,34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) 24-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19,21,23,34 and 35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 1762

***Response to Amendment***

1. Amendment filed on November 27, 2002 has been entered. Claims 20, 22 have been cancelled. New claims 34, 35 have been added. Claims 1-19, 21, 23, 34, 35 are pending in the application. Claims 24-33 are withdrawn from consideration as directed to a non-elected invention.

***Election/Restrictions***

2. Applicant's election with traverse of claims 1-19, 21, 23, 34, 35 in Paper No. 6 is acknowledged. The traversal is on the ground(s) that class and subclass of claims 1-21 is the same as those for claim 22; and division between claims 1-21 and 22 is clearly arbitrary because there is no difference between a claim to a "polymer" and a claim to a "polymeric material"; so that there is no additional burden placed upon the Examiner to search claims such as 22, directed to a polymer, in addition to search of claims 1-21, directed to a polymeric material.

This is not found persuasive because difference between claims 1-21 and 22 is not in terms "polymer" and "polymeric material" but in *method steps* of claims 1-21 and 22: steps a) - d) of claim 20 are substantially different from steps i) - iv) of claim 22 so that the search required for Group I is not required for Group II. Therefore, the search of both Groups I and II would place substantial additional burden on the Examiner.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Objections***

3. Claims 6, 7, 11, 13, 14, 34, 35 are objected to because of the following informalities: "viologen" and "viologen salt" are recited in the claims as interchangeable terms. Although these terms are also used in the art as interchangeable terms, Applicants are advised to recite in claims

the term "viologen salt" since independent claim 1 as well as the specification as filed use the term "viologen salt".

Claim 6, line 1, Claim 7, line 2, Claim 11, line 2, Claim 13, line 1, Claim 14, line 1, Claim 34, lines 1, 15, Claim 35, lines 1, 12, "viologen" should be changed to -- viologen salt --.

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-19, 21, 23, 34, 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 3-5, language of step i) "contacting a polymeric material capable of exhibiting electrical conductivity upon oxidative doping with viologen salt to form a pre-doped composition" is confusing because it is not clear with what compound a polymeric material is contacted to form a pre-doped composition. Clarification and/or correction requested. For examining purposes the phrase was interpreted according to the specification (See specification, page 6, lines 10-18) as -- contacting a polymeric material with viologen salt to form a pre-doped composition, said polymeric material being capable of exhibiting electrical conductivity upon oxidative doping with viologen salt --.

Claim 1, lines 2-3, the terms "doping", "pre-doped" renders the claim indefinite because the specification does not disclose what amount of viologen salt is considered to be a "doping amount" in a polymeric material (See specification, page 5, lines 7-10). Generally, it is well

Art Unit: 1762

known in the art that "dopant" is present in a polymer in a *minor* amount. However, upper limit of the *minor* amount varies in the art. The Examiner has looked for other uses of the term "doping amount" in polymeric material. For example, Afzali-Ardakani et al (US 5,776,370), 1998, describes "doping amount" as 5-50% per unit of a polymer material (See column 1, lines 52-58). For examining purposes the Examiner interpreted "a pre-doped composition" of claim 1 as a composition having up to 50 % of viologen salt.

Claim 5 recites the limitation "the polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the polymeric material --.

Claim 6 recites the limitation "the viologen bearing substrate" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- The method of claim 3, wherein a surface of the deposited viologen salt is partially or completely coated with the polymeric material --.

Claim 7 recites the limitation "the polymer" in line 1. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the polymeric material --.

Claim 7 recites the limitation "the viologen" in line 2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the viologen salt --.

Claim 7 recites the limitation "the polymer" in line 1. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the polymeric material --.

Art Unit: 1762

Claim 7, lines 1-2, a phrase "wherein the polymer is contacted with the viologen by forming a coating or film of the polymeric material in situ" renders the claim indefinite because its meaning is unclear. For examining purposes the phrase was interpreted as -- wherein the polymeric material is mixed with the viologen salt before forming a coating or a film --.

Claim 9 recites the limitation "the polymer coated substrate" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "the viologen" in line 2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the viologen salt --.

Claim 13 recites the limitation "the polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the polymeric material --.

Claim 14 recites the limitation "the polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the phrase was interpreted as -- the polymeric material --.

Claim 34 recites the limitation "the viologen coated polymeric material" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 34 recites the limitation "the mixture" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claim 34 recites the limitation "the viologen coated polymeric material" in line 15. There is insufficient antecedent basis for this limitation in the claim.

Claim 35 recites the limitation "the viologen bearing substrate" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1, 2, 10, 11, 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikhael et al (US 6,040,017) in view Porter (US 4,211,621).

As to claims 1, 2, 17, Mikhael et al disclose a method for preparing an electrically conductive polymeric material (See column 2, lines 66-67), comprising:

i) contacting a polymeric material such as polyaniline (See column 3, lines 47-48) with an organic electron-acceptor dopant such as quinone (See column 3, lines 45-47) to form a pre-doped composition (See column 2, lines 9-30); and

ii) irradiating the pre-doped composition with UV light (electromagnetic radiation of an appropriate wavelength) (See column 2, lines 38-39) thus producing electrically conductive polymeric material (See column 2, lines 66-67).

Mikhael et al fail to teach that an organic electron-acceptor is a viologen salt (Claim 1), wherein at least one of the 1,1'-substituents are independently selected from an alkyl group or a benzyl group (Claim 11), or a mixture of viologen salts (Claim 10).

Porter teaches that quinone and a viologen such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor for abstracting electrons from electron-donors (See column 4, lines 64-69; column 7, lines 39-47). The Examiner takes a position that viologen is salt, as evidenced by Saika et al (US 5,232,574, column 1, lines 12-43). In other

Art Unit: 1762

words, Porter teaches that quinone and a viologen salt such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a viologen salt such as methyl viologen or benzyl viologen instead of quinone electron-acceptor in Mikhael et al since Porter teaches that quinone and a viologen salt such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor so that the selection of any of these known material as an electron-acceptor in Mikhael et al would be within the level of ordinary skill in the art.

It is held that it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980). See also In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960); and Ex parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used combination of methyl viologen and benzyl viologen instead of quinone electron-acceptor in Mikhael et al since Porter teaches that quinone and a viologen salt such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor.

8. **Claims 1, 2, 7-11, 15, 17-19, 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Afzali-Ardakani et al (US 5,776,370) in view of Porter (US 4,211,621) and Rembaum (US 3,754,055).

As to claims 1, 8, 17, 23, Afzali-Ardakani et al disclose a method for preparing an electrically conductive polymeric material (article) (See column 1, lines 8-16; column 2, lines 31-



Art Unit: 1762

43), comprising contacting a polymeric material such as polyaniline with an organic electron acceptor (See column 4, lines 26-33) such as quinone (See column 3, lines 61-67) by depositing the organic electron acceptor on a polyaniline film to form a pre-doped charge transfer complex (CTC) of polyaniline with the electron acceptor (See column 1, lines 52-58; column 4, lines 44-52). The polyaniline film (polymeric material) is also deposited on a substrate (See column 4, lines 26-33).

Afzali-Ardakani et al fail to teach that an organic electron-acceptor is a viologen salt (Claims 1, 9) such as dihalide (Claim 15) or a mixture of viologen salts (Claim 10), wherein the 1,1'-substituents are independently selected from an alkyl group or a benzyl group (Claim 11).

Porter teaches that quinone and a viologen such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor (See column 7, lines 39-47). The Examiner takes a position that viologen is generally dihalide salt, as evidenced by Inata et al (US 5,068,062, column 1, lines 44-59). In other words, Porter teaches that quinone and a viologen salt such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a viologen salt instead of quinone electron-acceptor in Afzali-Ardakani et al since Porter teaches that quinone and a viologen salt are functionally equivalent for their use as an electron-acceptor so that the selection of any of these known material as an electron-acceptor in Afzali-Ardakani et al would be within the level of ordinary skill in the art.

It is held that it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072

Art Unit: 1762

(CCPA 1980). See also *In re Crockett*, 279 F.2d 274, 126 USPQ 186 (CCPA 1960); and *Ex parte Quadranti*, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used combination of methyl viologen and benzyl viologen instead of quinone electron-acceptor in Afzali-Ardakani et al since Porter teaches that quinone and a viologen salt such as methyl viologen or benzyl viologen are functionally equivalent for their use as an electron-acceptor.

Combination of Afzali-Ardakani et al and Porter fails to teach that the viologen salt is attached by grafting onto the polyaniline film utilizing electromagnetic radiation (Claim 1) such as UV radiation (Claim 2) at a temperature 0-80°C in the presence of air and in the absence of any solvent (Claim 19).

Rembaum teaches that grafting a quarternized *pyridine* onto a substrate can be easily performed by first quarternizing vinyl pyridine via reaction with alkyl halide, then grafting resulting quarternized vinyl *pyridine* onto the substrate utilizing gamma radiation at a temperature 0-80°C in the presence of air and in the absence of any solvent (See column 2, lines 10-17, 62-69; column 3, lines 1-50). It is well known in the art that gamma radiation is functionally equivalent to UV, plasma, etc. for grafting vinyl containing components onto substrates since grafting is normally initiated by the presence of peroxides or peroxy radicals that have been generated on the polymer surface via plasma, UV, or gamma-ray exposure with the monomer applied in a gas or liquid phase, as evidenced by Spence (US 6,083,355, column 24, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used UV radiation instead of gamma radiation in Rembaum for grafting quarternized vinyl pyridine vinyl

Art Unit: 1762

onto a substrate since it is well known in the art that gamma radiation is functionally equivalent to UV, plasma, as evidenced by Spence.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have attached a viologen salt onto a polyaniline film of combination of Afzali-Ardakani et al and Porter utilizing a vinyl containing viologen salt and UV radiation at a temperature 0-80°C in the presence of air and in the absence of any solvent since Rembaum teaches that grafting a quarternized *pyridine* onto a substrate can be easily performed by first quarternizing vinyl pyridine via reaction with alkyl halide, then grafting resulting quarternized vinyl *pyridine* onto the substrate utilizing gamma radiation at a temperature 0-80°C in the presence of air and in the absence of any solvent.

As to claim 7, Afzali-Ardakani et al further teach that a complexation of polyaniline with an electron acceptor can be prepared by *mixing* a polyaniline solution with a solution of the electron acceptor (See column 4, lines 37-41) so that polyaniline is contacted with the electron acceptor before forming a coating or a film.

As to claim 18, the polymeric material of combination of Ardakani et al and Porter would have reduced resistance by approximately 3-6 orders of magnitude within a period of 3 hours or less since it is held that products having identical or substantially identical structure or composition, would have identical or substantially identical properties.

9. **Claims 3-6, 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Afzali-Ardakani et al (US 5,776,370) in view of Porter (US 4,211,621) and Rembaum (US 3,754,055), as applied above, further in view of Beratan et al (US 5,016,063).

Art Unit: 1762

Combination of Afzali-Ardakani et al, Porter and Rembaum, as applied above, fails to teach that the viologen salt is deposited on a suitable substrate (Claims 3-5) so that polyaniline is coated on the viologen salt deposited on the substrate (Claim 6).

Beratan et al teach that for some applications a charge transfer complex (CTC) comprising polyaniline electron donor and a viologen salt electron acceptor can be positioned between two substrates wherein the complex is attached to a first substrate via the viologen salt and to a second substrate via polyaniline and preferably the viologen salt electron acceptor is connected to the polyaniline electron donor via an intermediate donor for an improved charge transfer (See Fig. 4b; column 6, lines 16-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned a charge transfer complex of combination of Afzali-Ardakani et al, Porter and Rembaum by attaching (depositing) a viologen salt onto a suitable substrate so that polyaniline is attached to the viologen salt depending on intended use of a final product since Beratan et al teach that for some applications a charge transfer complex (CTC) comprising polyaniline electron donor and a viologen salt electron acceptor can be positioned between two substrates wherein the complex is attached to a first substrate via the viologen salt and to a second substrate via polyaniline.

As to claim 35, combination of Afzali-Ardakani et al, Porter, Rembaum and Beratan et al, teaches that polyaniline can be deposited on (any) substrate (See Afzali-Ardakani et al, column 4, lines 27-28). However, the combination fails to teach that the substrate is of low density polyethylene (LDPE).

Art Unit: 1762

It is well known in the art that LDPE is suitable to use with CTCs for various purposes, as evidenced by Moshtev et al (US 4,234,623, column 2, lines 38-39) and Spence (US 6,083,355, column 6, lines 33, 43-44).

It is held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious); *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used LDPE as a substrate in combination of combination of Afzali-Ardakani et al, Porter, Rembaum and Beratan et al depending of intended use of the final product since it is well known in the art that LDPE is suitable to use with CTCs for various purposes, as evidenced by Moshtev et al and Spence.

Combination of Afzali-Ardakani et al, Porter, Rembaum and Beratan et al also fails to teach that viologen salt bearing substrate is formed by providing vinyl alkyl halide grafted substrate; and forming a viologen salt on the vinyl alkyl halide or vinyl benzyl halide grafted substrate via a reaction with 4,4' bipyridine and subsequently with alkyl halide.

The Examiner takes a position that the recited steps represent well known conventional methods of organic synthesis, i.e., grafting chloromethyl functional groups on a suitable polymeric substrate using vinyl alkyl (benzyl) chloride utilizing radiation or plasma is well known and conventionally used in the art, as evidenced by Rembaum (US 3,754,055, column 3, lines 41-44), Spence (US 6,083,355, column 24, lines 6-13), McRae (US 5,141,717, column 8, lines 1-10), as

Art Unit: 1762

well as reacting the chloromethyl functional groups with tertiary nitrogen containing compound such as pyridine to produce a grafted quarternized pyridine on the polymeric substrate, as evidenced by Jones (US 4,112,207, column 8, lines 54-55), and quarternizing a grafted tertiary nitrogen containing compound by reacting with alkyl halide, as evidenced by Katsurada et al (US 5,498,336, column 7, lines 62-67, column 8, lines 1-2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed viologen salt bearing substrate using claimed steps since claimed steps represent well known conventional methods of organic synthesis, as evidenced by Rembaum, Spence, McRae, Jones, Katsurada et al.

10. **Claims 12-14, 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Afzali-Ardakani et al (US 5,776,370) in view Porter (US 4,211,621) and Rembaum (US 3,754,055), as applied above, and further in view of Inata et al (US 5,068,062).

Combination of Afzali-Ardakani et al, Porter and Rembaum, as applied above, fails to teach that viologen salt is a polymeric viologen salt (Claim 12) wherein the viologen moiety is present in the backbone of the polymeric viologen salt (Claim 13) such as viologen dihalide (Claim 16) or as a side chain of the polymeric viologen salt (Claim 14).

Inata et al teach that it is well known in the art that a polymeric viologen salt such as viologen dihalide (See column 1, lines 44-59) is more industrially applicable because it has longer repetition life (See column 1, lines 18-28) having the viologen moiety either in the backbone of the polymeric viologen salt (See column 2, lines 1-13) or as a side chain of the polymeric viologen salt (See column 1, lines 42-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a polymeric viologen salt having the viologen moiety either in the backbone of

Art Unit: 1762

the polymeric viologen salt or as a side chain of the polymeric viologen salt as an viologen acceptor in combination of Afzali-Ardakani et al and Porter with the expectation of providing the desired long repetition life, as taught by Inata et al.

11. **Claims 34, 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Afzali-Ardakani et al (US 5,776,370), Porter (US 4,211,621) and Rembaum (US 3,754,055), as applied above, further in view of Allemand et al (US 5,729,379).

Combination of Afzali-Ardakani et al, Porter and Rembaum, as applied above, teaches that polyaniline can be deposited on (any) substrate (See Afzali-Ardakani et al, column 4, lines 27-28). However, the combination fails to teach that the substrate is of low density polyethylene (LDPE).

It is well known in the art that LDPE is suitable to use with CTCs for various purposes, as evidenced by Moshtev et al (US 4,234,623, column 2, lines 38-39) and Spence (US 6,083,355, column 6, lines 33, 43-44).

It is held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious); *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used LDPE as a substrate in combination of Afzali-Ardakani et al, Porter and Rembaum depending of intended use of the final product since it is well known in the art that LDPE is suitable to use with CTCs for various purposes, as evidenced by Moshtev et al and Spence.

Art Unit: 1762

Combination of Afzali-Ardakani et al, Porter and Rembaum also fails to teach that: (i) polyaniline is formed on the substrate in situ by immersing the LDPE substrate into the solution of aniline and ammonium sulfate to form a polyaniline coated substrate; (ii) irradiating the coated substrate with UV in the presence of vinyl alkyl halide or vinyl benzyl halide to form a vinyl alkyl halide or vinyl benzyl halide substrate; and (iii) forming a viologen salt on the vinyl alkyl halide or vinyl benzyl halide grafted substrate via a reaction with 4,4' bipyridine and alkyl halide.

As to (i), it is well known in the art that polyaniline can be formed on a substrate in situ by immersing the substrate into the solution of aniline and ammonium sulfate as evidenced by Allemand et al (US 5,729,379, column 13, lines 1-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a coating of polyaniline in situ on a substrate of combination of Afzali-Ardakani et al, Porter and Rembaum using a method well known in the art comprising immersing a substrate into a solution of aniline and ammonium sulfate with the expectation of providing the desired polyaniline coated substrate, as evidenced by Allemand et al.

As to steps (ii), (iii), the Examiner takes a position that the recited steps (i)-(iii) represent well known conventional methods of organic synthesis, i.e., grafting chloromethyl functional groups using vinyl alkyl (benzyl) chloride utilizing radiation or plasma is well known and conventionally used in the art, as evidenced by Rembaum (US 3,754,055, column 3, lines 41-44), Spence (US 6,083,355, column 24, lines 6-13), McRae (US 5,141,717, column 8, lines 1-10), as well as reacting the chloromethyl functional groups with tertiary nitrogen containing compound such as pyridine to produce a grafted quarternized pyridine on the polymeric substrates, as evidenced by Jones (US 4,112,207, column 8, lines 54-55), and quarternizing a grafted tertiary



Art Unit: 1762

nitrogen containing compound by reacting with alkyl halide, as evidenced by Katsurada et al (US 5,498,336, column 7, lines 62-67, column 8, lines 1-2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed polyaniline/viologen salt CTC using claimed steps (i)-(iii) for depositing polyaniline in situ on a suitable substrate including claimed LDPE followed by attaching the viologen salt on the deposited polyaniline since the steps (i)-(iii) represent well known conventional methods of organic synthesis, as evidenced by Rembaum, Spence, McRae, Jones, Katsurada et al.

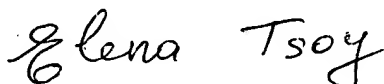
### *Conclusion*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is (703) 605-1171. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Elena Tsoy  
Examiner  
Art Unit 1762



December 16, 2002